Review Exercise Set 4

Exercise 1: Factor completely.

$x^4 + 4x^2 - 32$

Exercise 2: Factor completely.

$x^2(x + 3) - 2x(x + 3) - 8(x + 3)$

Exercise 3: Solve for x.

$x^4 - 21x^2 + 54 = 0$

Exercise 4: Solve for n

$$3n^4 + 17n^2 + 20 = 0$$

Exercise 5: Solve for t.

$$6t^4 - 29t^2 + 28 = 0$$

Review Exercise Set 4 Answer Key

Exercise 1: Factor completely.

$$x^4 + 4x^2 - 32 = \left(x^2 + 8\right)\left(x^2 - 4\right)$$
$$= \left(x^2 + 8\right)\left(x + 2\right)\left(x - 2\right)$$

$(x^2 + 8)(x + 2)(x - 2)$

Exercise 2: Factor completely.

$$x^2\left(x+3\right) - 2x\left(x+3\right) - 8\left(x+3\right) = \left(x+3\right)\left(x^2 - 2x - 8\right)$$
$$= \left(x+3\right)\left(x-4\right)\left(x+2\right)$$

(x + 3)(x - 4)(x + 2)

Exercise 3: Solve for x.

$$x^4 - 21x^2 + 54 = 0$$
$$\left(x^2 - 3\right)\left(x^2 - 18\right) = 0$$

$$x^2 - 3 = 0 \quad \textit{or} \quad x^2 - 18 = 0$$
$$x^2 = 3 \qquad\qquad x^2 = 18$$
$$x = \pm\sqrt{3} \qquad\qquad x = \pm\sqrt{18}$$
$$x = \pm\sqrt{3} \qquad\qquad x = \pm 3\sqrt{2}$$

$$x = -3\sqrt{2}, -\sqrt{3}, \sqrt{3}, 3\sqrt{2}$$

Exercise 4: Solve for n

$$3n^4 + 17n^2 + 20 = 0$$
$$\left(3n^4 + 5\right)\left(n^2 + 4\right) = 0$$

Exercise 4 (Continued):

$$3n^2+5=0 \qquad or \quad n^2+4=0$$
$$3n^2=-5 \qquad n^2=-4$$
$$n^2=-\frac{5}{3} \qquad n^2=-4$$
$$n=\pm\sqrt{-\frac{5}{3}} \qquad n=\pm\sqrt{-4}$$
$$n=\pm\frac{i\sqrt{15}}{3} \qquad n=\pm 2i$$

$$n=-2i,\quad -\frac{i\sqrt{15}}{3},\quad \frac{i\sqrt{15}}{3},\quad 2i$$

Exercise 5: Solve for t.

$$6t^4-29t^2+28=0$$
$$\left(3t^2-4\right)\left(2t^2-7\right)=0$$

$$3t^2-4=0 \qquad or \quad 2t^2-7=0$$
$$3t^2=4 \qquad 2t^2=7$$
$$t^2=\frac{4}{3} \qquad t^2=\frac{7}{2}$$
$$t=\pm\sqrt{\frac{4}{3}} \qquad t=\pm\sqrt{\frac{7}{2}}$$
$$t=\pm\frac{2}{\sqrt{3}} \qquad t=\pm\frac{\sqrt{7}}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}$$
$$t=\pm\frac{2\sqrt{3}}{3} \qquad t=\pm\frac{\sqrt{14}}{2}$$

$$t=-\frac{\sqrt{14}}{2},\ -\frac{2\sqrt{3}}{3},\ \frac{2\sqrt{3}}{3},\ \frac{\sqrt{14}}{2}$$